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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,335	12/11/2003	Tinku Acharya	42P14839	1354

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EXAMINER
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ABDI, AMARA

ART UNIT	PAPER NUMBER
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2609

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/13/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/734,335	<b>Applicant(s)</b> ACHARYA ET AL.	
	<b>Examiner</b> Amara Abdi	<b>Art Unit</b> 2609	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Specification***

1. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

#### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(g) BRIEF SUMMARY OF THE INVENTION.

(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING (S).

(i) DETAILED DESCRIPTION OF THE INVENTION.

(j) CLAIM OR CLAIMS (commencing on a separate sheet).

(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

The examiner suggests inserting a brief summary of the invention in the specification.

### ***Claim Objections***

2. Claims 1-27 are objected to because of the following informalities:

(1) Claim 1, line 3, "**the** validity" should be changed to "**a** validity", the same informality was found in **claim 10**, line 6-7; and **claim 19**, line 5;

(2) Claim 2, line 1, "**a** definition" should be changed to "**the** definition", and "**a** minutia" should be changed to "**the** minutia"; the same informalities were found in the following claims: **claim 3**, line 1; and **claim 4**, line 1; **claim 11**, line 1; **claim 12**, line 1; **claim 13**, line 1, **claim 20**, line 1; **claim 21**, line 1; and **claim 22**, line 1;

(3) Claim 5, line 1, "a score" should be changed to "**the** score"; the same informality on **line 2**; and on line 1-2, "a minutia" should be changed to "**the** minutia"; the same informalities were found in the following claims:

**Claim 6**, line 1-2; **claim 7**, line 1-2; **claim 8**, line 1-2; **claim 14**, line 1-2; **claim 15**, line 1-2; **claim 16**, line 1-2, **claim 17**, line 1-2; **claim 23**, line 1-2; **claim 24**, line 1-2; **claim 25**, line 1-2; and **claim 26**, line 1-2.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1,4,10,13,19 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Ser et al. (US PG PUB 2004/0199775)

(1) Regarding claims 1,10, and 19:

Ser et al. disclose a method, an apparatus, and a computer readable storage medium (paragraph [0001], line 1-3), comprising:

defining a plurality of minutiae in a fingerprint image (paragraph [0029], line 2-4), and (paragraph [0124], line 1-3);

estimating a score associated with a minutia corresponding to the validity of minutia (paragraph [0078], line 5-9), and (paragraph [0125], line 1-5); and

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matching the fingerprint image against one or more sample fingerprint images utilizing a partial point set pattern matching (PSPM) minutia (paragraph [0126], line 1-5), (the examiner interpreted that the step 505, in figure 5, has the same function as the pattern matching algorithm).

(2) Regarding claim 4,13, and 22:

Ser et al. disclose a method, an apparatus, and a computer readable storage medium (paragraph [0001], line 1-3), where the definition of the minutia includes data related the estimated score for the minutia (paragraph [0078], line 5-9), and (paragraph [0125], line 1-5).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 2,3,5,6,11,12,14,15,20,21,23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ser et al. in view of Larcher et al. (US 4,790,564).

(1) Regarding claims 2,11, and 20:

Ser et al. disclose all the subject matter as described in claims 1,10, and 19 above.

However, Ser et al. does not disclose the method, where the definition of the minutia includes data related to x, y coordinates and an angle for the minutia as recited in claims 2,11, and 20.

Larcher et al. teaches an automatic fingerprint identification system including processes and apparatus for matching fingerprint, where the definition of the minutia includes data related x, y coordinates and an angle for the minutia (column 7, line 45-48)

One skilled in the art would have clearly recognized the method, where the definition of minutia includes x, y, which denote the location coordinates and an angle between the x-axis and the direction of the lines around the minutia point (column 7, line 52-54). Therefore it would have been obvious to one in ordinary skill at the time of the invention to combine the system of Larcher et al., where the minutia has the x, y coordinates, and an angle, in the system of Ser et al., because such feature minimize the error due to the digitization of the variable used during the matching process (column 3, line 66-68), as well as increasing reliability over existing system (column 4, line 14-15).

(2) Regarding claims 3,12, and 21:

Ser et al. disclose all the subject matter as described in claims 1,10, and 19 above.

However, Ser et al. does not disclose the method, where the definition of the minutia includes data related to classification of the minutia as a termination or bifurcation minutia as recited in claims 3,12, and 21.

Larcher et al. teaches an automatic fingerprint identification system including processes and apparatus for matching fingerprint, where the definition of the minutia includes data related classification of the minutia (column 6, line 61) as a termination or bifurcation minutia (column 1, line 15-18).

One skilled in the art would have clearly recognized the method, where the definition of minutia includes the classification of the minutia (column 6, line 60-64) as a termination or bifurcation minutia (column 1, line 15-18). Therefore it would have been obvious to one in ordinary skill at the time of the invention to combine the system of Larcher et al., where the minutia are classified as termination or bifurcation, in the system of Ser et al., because such feature takes into account the quality of the fingerprint being compared (column 4, line 2-3), so only minutia of a file print having registration with minutia of a search print are compared for all coordinates relevant to matching theses minutes (column 4, line 9-11).

(3) Regarding claims 5,14, and 23:

Ser et al. disclose all the subject matter as described in claims 1,10, and 19 above.

However, Ser et al. does not disclose the method, where estimating the score associated with the minutia includes estimating the score for ridge flow properties associated with the minutia as recited in claims 5,14, and 23.

Larcher et al. teaches an automatic fingerprint identification system including processes and apparatus for matching fingerprint, where the score associated with minutia is estimated (paragraph [0078], line 5-9) for ridge flow properties associated



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with the minutia (column 1, line 10), (the ridge flow is interpreted as fingerprint or particular pattern consisting of lines corresponding to the ridge).

One skilled in the art would have clearly recognized the method, where estimating the score (paragraph [0125], line 1-5) for ridge flow properties associated with the minutia (column 1, line 10). Therefore it would have been obvious to one in ordinary skill at the time of the invention to combine the system of Larcher et al., where estimating the score for ridge flow properties associated with the minutia, in the system of Ser et al, because such feature is limiting the number of computations required to perform the matching of a latent print against file prints in the database (column 3, line 56-58).

(4) Regarding claims 6,15, and 24:

Ser et al. disclose all the subject matter as described in claims 1,10, and 19 above.

However, Ser et al. does not disclose the method, where estimating the score associated with the minutia includes estimating the score for valley flow properties associated with the minutia as recited in claims 6,15, and 24.

Larcher et al. teaches an automatic fingerprint identification system including processes and apparatus for matching fingerprint, where the score associated with minutia is estimated (paragraph [0078], line 5-9) for valley properties associated with the minutia (column 1, line 10), (the valley flow is interpreted as or particular pattern consisting of lines corresponding to the valley).

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One skilled in the art would have clearly recognized the method, where estimating the score (paragraph [0125], line 1-5) for valley flow properties associated with the minutia (column 1, line 10). Therefore it would have been obvious to one in ordinary skill at the time of the invention to combine the system of Larcher et al., where estimating the score for valley flow properties associated with the minutia, in the system of Ser et al, because such feature is limiting the number of computations required to perform the matching of a latent print against file prints in the database (column 3, line 56-58).

7. Claims 7,16, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ser et al. in view of Lin et al. (US 6,763,127).

Ser et al. disclose all the subject matter as described in claims 1,10, and 19 above.

However, Ser et al. does not disclose the method, where estimating the score for noise associated with the minutia as recited in claims 7,16, and 25.

Lin et al. teaches an apparatus and method for fingerprint recognition system, where estimating the score for noise associated with the minutia (column 2, line 60, and line 63-64).

One skilled in the art would have clearly recognized the method, where estimating the score for the noise associated with the minutia (column 2, line 60-67). Therefore it would have been obvious to one in ordinary skill at the time of the invention to combine the system of Lin et al., where estimating the score for noise associated with

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the minutia, in the system of Ser et al., because such feature can extract useful fingerprint information when a partial fingerprint is acquired (column 1, line 19-20), and generate a high matching score after transformation, as the point in the test image falls in close range of a point in the reference image and with the same type of orientation (column 3, line 4-6).

8. Claims 8,17, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ser et al. in view of Larcher et al., and further in view of Lin et al. (US 6,763,127).

Ser et al. disclose all the subject matter as described in claims 1,10, and 19 above.

However, Ser et al. and Larcher et al. do not disclose the method, where determining the score by summing the noise associated with the minutia as recited in claims 8,17, and 26.

Lin et al. teaches an apparatus and method for fingerprint recognition system, where estimating the score by summing the score for noise associated with minutia (column 2, line 60-67; and column 3, line 22)

One skilled in the art would have clearly recognized the method, where summing the score for the noise associated with the minutia (column 2, line 60-67; and column 3, line 20-23). Therefore it would have been obvious to one in ordinary skill at the time of the invention to combine the system of Lin et al., where summing the score for noise associated with the minutia, in the system of Ser et al. and Larcher et al., because such feature incorporates a higher lever of abstraction more closely resembling human

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subjective concepts (column 3, line 3-35), by using a strict Boolean mathematical rules to draw true/false conclusion when matching scores (column 3, line 25-26).

9. Claims 9,18, and 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ser et al. in view of Ailisto et al. (US PG PUB 2003/0007671).

Ser et al. disclose all the subject matter as described in claims 1,10, and 19 above.

However, Ser et al. does not disclose the method, where the partial point set pattern matching (PSPM) algorithm performs two-dimensional PSPM matching under translation and rotation as recited in claims 9,18, and 27.

Ailisto et al. teaches a biometric identification method and apparatus, where the pattern matching algorithm perform N-dimensional matching (paragraph [0041], line 4) under translation and rotation (paragraph [0030], line 7), (the examiner interpreted that tow-dimensional matching is including in N-dimensional matching).

One skilled in the art would have clearly recognized the method, where the pattern-matching algorithm performs two-dimensional PSPM matching (paragraph [0041], line 1-5) under translation and rotation (paragraph [0030], line 1-14). Therefore it would have been obvious to one in ordinary skill at the time of the invention to combine the system of Ailisto et al., where the pattern-matching algorithm using matching under translation and rotation, in the system of Ser et al., because such feature provides one-to-one identification of a person, and it could be could be accomplished reliably with limited computing capacity (paragraph [0007], line 3-4), so this method is applicable in

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many different cases as it does not require a lot of memory and computing capacity. For example it can be implemented in various building pass system and replacing different security codes in various system requiring identification (paragraph [0042], line 2-6).

### ***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tumey et al. (US PGPUB 2002/0034319) disclose a fingerprint verification system utilizing a facial image-based heuristic search method.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amara Abdi whose telephone number is (571) 270-1670. The examiner can normally be reached on Monday through Friday 7:30 Am to 5:00 PM E.T..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Amara Abdi  
04/04/2007.



**SHUWANG LIU**  
**SUPERVISORY PATENT EXAMINER**